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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,189	06/23/2006	Hongyuan Wang	1752-0183PUS1	8002

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BIRCH STEWART KOLASCH & BIRCH  
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FALLS CHURCH, VA 22040-0747

EXAMINER
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LISTVOYB, GREGORY

ART UNIT	PAPER NUMBER
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1796

NOTIFICATION DATE	DELIVERY MODE
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07/31/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/584,189	<b>Applicant(s)</b> WANG ET AL.	
	<b>Examiner</b> GREGORY LISTVOYB	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 May 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/25/2006</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

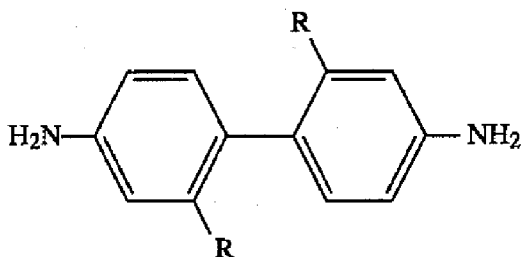
### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 rejected under 35 U.S.C. 103(a) as being unpatentable over Maruta et al (US 5478918) herein Maruta (necessitated by amendment).

Maruta discloses a polyamic acid composition solution includes a tetracarboxylic acid component containing not less than 70 mol % of at least one selected from the group consisting of benzenetetracarboxylic acid and its reactive derivatives; a maleimide compound; and a diamine component containing not less than 70 mol % of 2,2'-substituted-4,4'-benzidine represented by the general formula (I):



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Where R is CF<sub>3</sub>, CH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub> (meets the limitations of Claim 1),  
Halogen or Phenyl (see Abstract).

Maruta teaches that tetracarboxylic acid dianhydride component comprises at least 70% mol of pyromellitic dianhydride (see Column 3, line 5) and less than 30% of other aromatic dianhydride including oxydiphthalic acid or biphenyltetracarboxylic acid dianhydride (see Column 3, line 10, meeting the limitations of Claims 5 and newly added claim 8).

Regarding Claims 2 and 4 Maruta teaches a polyamic acid comprising less than 29% mol of other diamine, such as phenylenediamine (see Column 3, line 65).

In reference to Claim 7, since Maruta's polyimide has the structure, which has the same main components as the Applicant's polymer, it meets the values of the elastic modulus, moisture adsorption, coefficient of thermal and humidity expansion of the above claim.

Maruta does not disclose hydrocarbon group R having 3-6 aroms.

However, Methyl and Ethyl groups, disclosed by Maruta are homologs of higher hydrocarbons, claimed in claim 1 as amended.

In accordance to MPEP 2144.09 the structural analogs are *prima facie* obvious in the absence of showing unexpected results.

Therefore, it would have been obvious to a person of ordinary skills in the art to replace Maruta's Methyl and Ethyl substitutes to higher hydrocarbons with reasonable expectations of success.

Maruta does not disclose 2,2'-ethoxy-4,4'-benzidine and phenylenediamine in his Examples.

However, according to MPEP 2123, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments (see also *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971), *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994) , *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

In Examiner's position, 2,2'-ethoxy-4,4'-benzidine is a reasonable choice, since it provides a bulky group (compare to CF<sub>3</sub>, CH<sub>3</sub>, Hal or OCH<sub>3</sub>), which decreases intermolecular interactions between polyimide precursor chains, increasing its processability. Phenylenediamine and other aromatic diamines enhance such mechanical properties as Young Modulus and toughness of the final product (film).

Therefore, it would have been obvious to a person of ordinary skills in the art to use 2,2'-ethoxy-4,4'benzidine and phenylenediamine in Maruta's composition, since it provides good processability and good mechanical properties (Young Modulus and toughness) of the final product.

### ***Response to Arguments***

Applicant's arguments filed on 5/14/2008 have been fully considered but they are not persuasive.

Applicant argues that amended claims exclude the possibility of methoxy or ethoxy substituents on the phenyl rings in formulas (1) and (3).

However, Methyl and Ethyl groups, disclosed by Maruta are homologs of higher hydrocarbons, claimed in claim 1 as amended.

In accordance to MPEP 2144.09 the structural analogs are *prima facie* obvious in the absence of showing unexpected results.

Applicant argues that based on the Examples 9-14 of the Specification (see Table 2), propoxy substituted polyimide demonstrates better values of coefficient of moisture adsorption (CTE) and coefficient of humidity expansion compare (CHE) to ethoxy substituted polymer.

As it can be seen in Table 2, for ethoxy substituted polymers CTE values are within the range of -7.7 to 58 ppm/C, whereas for propoxy substituted ones the values are within the range of 11 to 66 ppm/C. It is clear that the above ranges are overlapped significantly. Therefore, there are no positive data presented showing the advantage of propoxy-substitutes over ethoxy ones in terms of CTE values. In addition, for fair comparison of the polyimides, it would be beneficial to exclude other variables, such as molecular weight, aromatic block type and content, etc.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY LISTVOYB whose telephone number is (571)272-6105. The examiner can normally be reached on 10am-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rabon Sergent/  
Primary Examiner, Art Unit 1796

GL

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